APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/982,048	10/18/2001	Brian L. Ganz		8497

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John R. Ross, III
Ross Patent Law Office
P.O. Box 2138
Del Mar, CA   92014

EXAMINER
MILLER, MARTIN E

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 08/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

| Office Action Summary | Application No. 09/982,048 | Applicant(s) GANZ ET AL. |
| | Examiner Martin Miller | Art Unit 2623 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-28_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-28_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on _18 October 2001_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _3_ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

Drawings

1.   The drawings are objected to because figure 33. block 448, the word "welll" should be

spelled --well-. A proposed drawing correction or corrected drawings are required in reply to the

Office action to avoid abandonment of the application. The objection to the drawings will not be

held in abeyance.

Information Disclosure Statement

2.   The Examiner has considered the references cited in the IDS filed October 18, 2001 and

an initialed copy of the IDS is attached to this office action.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1, 2, 5, 6, 10, 13, 14, 17, 18, 22, 30, 31, 34, 35, and 39 are rejected under 35

U.S.C. 102(b) as being clearly anticipated by DeTitta et al. (hereinafter DeTitta), US 6368402.

As per claim 1, DeTitta teaches:

A) at least one camera, (col. 10, ll. 41-42);

B) an indexing device ("custom built travel image stand", col. 10, ll. 38-41 and Daedal X-

Y Precision with 4 axis indexing card, col. 10, ll. 47-50) for sequentially placing said

microscopic crystals in camera view of said at least one camera (col. 10, ll. 42-43); and

C) at least one computer (figure 9) programmed to control said indexing device and said

at least one camera, wherein said at least one computer is programmed (col. 10, ll. 63-65) to

receive from said at least one camera images (col. 11, ll. 7-9) of said plurality of microscopic

crystals, wherein said at least one computer is programmed to classify (encoded zero or one, col.

11, ll. 14-23) said plurality of microscopic crystals.

As per claim 2, DeTitta teaches:

a computer monitor (col. 10, l. 67-col. 11, l. 3, figure 9 , element 36), wherein an operator

interfacing with said at least one computer manually inputs a score (a "1" or "0", col. 14-17) to

classify said plurality of microscopic crystals after observing said plurality of microscopic

crystals on said computer monitor.

As per claim 5, DeTitta teaches:

wherein each of said plurality of microscopic crystals are contained within a

drop of liquid (col. 9, ll. 52-57), wherein each drop of liquid is contained within a well of a

micro-well plate (col. 10, ll. 2-3, see figures 1-4).

As per claim 6, DeTitta teaches:

wherein said plurality of microscopic crystals are a plurality of protein crystals inside the

wells of at least one micro-well plate (col. 11, ll. 8-10, see figure 8).

As per claim 10, DeTitta teaches:

a frame grabber for receiving images of said plurality of microscopic crystals from said at

least one camera (col. 10, ll. 52-53).

As per claim 13, DeTitta teaches:

A) sequentially placing said plurality of microscopic crystals in camera-view (col. 10, ll. 42-43) of at least one camera utilizing an indexing device (Daedal X-Y Precision with 4 axis indexing card, col. 10, ll. 47-50);

B) taking the images of said plurality of microscopic crystals with said at least one camera (video system records individual wells, col. 10, ll. 42-43 and feeds into a framegrabber, col. 10, ll. 51-53),

C) transferring said images to at least one computer (the images are recoded and saved to a file, col. 10, ll. 53-58),

D) receiving said images at said at least one computer (col. 10, l. 67-col. 11, ll. 3), and

E) classifying said images at said at least one computer (col. 11, ll. 8-17), wherein said at least one computer is programmed to control said at least one indexing device and said at least one camera (the table motion and image capturing is computer controlled, col. 10, ll. 52-55).

As per claim 14, DeTitta teaches:

wherein said step of classifying said images at said at least one computer is done manually, wherein an operator interfacing with said at least one computer and viewing a computer monitor (col. 11, ll. 8-11) manually inputs into said at least one computer a score ("1" or "0", col. 11, ll. 14-15) to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.

As per claims 17, 18, and 22, these claims recite substantially the same limitations as claims 5, 6, and 10 above and analogous remarks apply.

As per claims 30, 31, 34, 35, and 39, they recite substantially the same limitations as claims 1, 2, 5, 6, and 10, above and analogous remarks apply.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

6.   Claims 3, 15 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over

DeTitta as applied to claim1, 13, and 30 above, and further in view of Jurisica, I et al.

(hereinafter Jurisica), "Intelligent decision support for protein crystal growth, IBM Systems

Journal, vol. 40, no. 2, 2001.

As per claims 3, 15 and 32, DeTitta teaches that the computer presents the views to a user

to classify; DeTitta does not specifically teach automatic classification. However, Jurisica

teaches:

wherein said at least one computer automatically classifies said plurality of microscopic

crystals after receiving said images (p. 396, col. 2, last 2 lines and over to p. 397, first paragraph

and p. 402, section entitled 3. Classification).

It would have been obvious to one of ordinary skill in the art to use the automatic

classification system of Jurisica in the system of DeTitta to eliminate human intervention in

order to cope with the high-throughput of the robotic setup (Jurisica, p. 398, col. 2, section

entitled Image analysis). One of ordinary skill would be motivated to look at the Jurisica

reference because DeTitta is a co-author of the article and DeTitta also uses a high-throughput

robotic set-up. Use of the automatic classification feature would clearly increase system speed

and efficiency once optimized.

As per claim 28, DeTitta does not specifically teach comparing images to images stored in the database, although he does teach comparing collected image data to data stored in the a database (comparison of precipitation scores, col. 11, ll. 26-50). However, Jurisica teaches: step of classifying said images at said at least one computer comprises the sub steps of:

A) comparing said images (figure 7, p. 403) to a database stored on said at least one computer (p. 402, col. 1), and

B) assigning a classification based on said comparison (uniform, granular or microcrystalline, p. 402, col. 1), and

As per claim 29, DeTitta teaches:

A) making a determination as to whether a microscopic crystal exists (a "1", col. 11, l. 15),

B) making a determination as to what is present if said microscopic crystal does not exist, and (a "0", col. 11, l. 14). However, DeTitta does not specifically teach a determination of quality although DeTitta does teach such a feature.

C) making a determination as to the qualities of said microscopic crystal if said microscopic crystal does exist (uniform, granular or microcrystalline, p. 402, col. 1).

Claims 4, 16, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta, Harris and Update as applied to claims 7, 19, and 36 above, and further in view of Reimer et al., (hereinafter Reimer), US 60610861.

As per claim 4, DeTitta does not specifically teach the use of two cameras, However, Reimer teaches:

wherein said at least one camera is a first camera and a second camera, wherein said first

camera is set at a constant zoom to cover a large field of view (fig. 3, element 20, col. 6, ll. 61-

63, wherein said second camera comprises a motorized zoom lens controllable (fig. 3, element

30, col. 6, ll. 63-66) by said at least one computer (col. 7, ll. 20-28).

It would have been obvious to one of ordinary skill in the art to eliminate the data volume

while still maintaining the processing capability equivalent to the human visual system, which

provides the greatest accuracy in classifying image objects as defective (Reimer, col. 3, ll. 33-

55).

7.   Claims 7, 19, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over

DeTitta as applied to claims 1, 13 and 30 above, and further in view of Harris et al., (hereinafter

Harris), US6388788 B1 and Automation Update (hereinafter Update), "Open for Inspection:

Parker Daedal's New Positioner designed for Inspection Applications", Jan.

1998,www.textronics.com/ Newsletters/archivedarticles/1998/0198newsletter.pdf.

As per claims 7, 19, and 36, DeTitta teaches:

wherein said indexing device comprises:

A. a first linear actuator for horizontally positioning said positioning station (Daedal X-Y

Precision, col. 10, ll. 48-53), Update teaches that the X-Y Precision can accept microscopes and

other machine vision inspection equipment.   DeTitta nor Update specifically teach being able to

move in a vertical axis, although DeTitta does teach that the plate glass and framework are

controlled by a 4 axis indexing card. Four (4) axis to the examiner indicates movement in the X,

Y, and Z axes. However Harris teaches:

B. a second linear actuator for horizontally positioning said at least one camera (col. 15,

ll. 3-5, although Harris teaches an XY controller moves the 96 well (microtiter) plate, it would

have been obvious to one of ordinary skill in the art that the camera could be moved instead of

the well plate), and

C. a third linear actuator for vertically positioning said at least one camera (col. 14, l. 66).

It would have been obvious to one of ordinary skill in the art to use the suggestions of

Update, which more thoroughly describes the custom capabilities of the Daedal X-Y Precision

table disclosed in DeTitta, and those features disclosed in Harris to incorporate obvious camera

manipulation apparatus into the custom built table and indexing device disclosed in DeTitta to

provide the most cost effective by using commercial-of-the-shelf available parts and time

efficient to keep up with the high throughput requirements of DeTitta (abstract) to build an

indexing device. One of ordinary skill would be motivated to use the above prior art systems

particularly since Harris is directed towards imaging a 96 well plate as is DeTitta.

8.   Claims 8, 20 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over

DeTitta, Harris and Update as applied to claims 7, 19, and 36 above, and further in view of

Reimer et al., (hereinafter Reimer), US 60610861.

As per claims 8, 20 and 37, DeTitta nor Update teach using two cameras. Harris teaches

using two cameras (col. 16, ll. 53-56), but does not teach one camera having a constant zoom

and the other having a motorized zoom. Although Harris does teach a motorized zoom (col. 14,

l. 66). However, Reimer teaches:

wherein said at least one camera is a first camera and a second camera, wherein said first

camera is set at a constant zoom to cover a large field of view (figure 3, element 20, col. 6, ll. 62-

63), wherein said second camera comprises a motorized zoom lens (col. 6, l. 63-.col. 7, l. 1) controllable by said at least one computer (col. 7, ll. 20-29).

It would have been obvious to one of ordinary skill in the art to use the two camera feature of Reimer in the system of DeTitta, Update and Harris, to provide accuracy in finding the well locations by allowing the wide field of view camera image to be scanned to locate target (wells) images, particularly since both DeTitta and Harris are directed towards locating well positions and performing high speed classification.

9.   Claims 9, 11, 12, 21, 23, 24, 38, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta as applied to claims 1, 13, and 30 above, and further in view of Inokuchi, US 6259960 B1.

As per claims 9, 21, and 38, DeTitta discloses that the user can name a plate manually, but does not specifically state that a barcode is used. Nor does DeTitta teach a plate sensing device. However, Inokuchi teaches:

comprising a bar-code reader (col. 7, ll. 36-40 and col. 18, ll. 39-41) and a micro-well plate sensing device (part moving means moves the part to be inspected into the target coordinate region, col. 7, ll. 60-65, or alternatively, the state coordinate system is adjusted based upon the imaged x-y difference between the target coordinates and the state coordinates, col. 8, ll. 23-39).

It would have been obvious to one of ordinary skill in the art to use Inokuchi's automated bar-code reader to input the information regarding the plate instead of manually inputting that data into the computer which may result in mistaken information. Also, Inokuchi teaches that it is well known to have position sensing capabilities in inspection devices, which facilitates automated inspection because precise placement of the target plate is not a true concern. One of

ordinary skill in the art would have been motivated to look at the inspection device of Inokuchi

because it is directed towards automatic image processing of microscopic images for certain

features to be found in the image. Inokuchi also has a manual inspection mode as well as an

automatic inspection mode.

As per claims 11, 23, and 40, although DeTitta teaches that his inspection system is used

on a computer, he does not specifically teach that is part of a network. Inokuchi is directed to a

material-inspection and classification apparatus (col. 17, ll. 18-21, 24-26). However, as per

claims 11, 23, and 40, Inokuchi teaches:

wherein said at least one computer is connected to a computer network. (figure 1, col. 16,

ll. 60-65).

It would have been obvious to one of ordinary skill in the art to use the networking

suggestion of Inokuchi in the inspection and classification system of DeTitta to facilitate

management of classification information at a central location thereby making it unnecessary to

save and download classification data from individual plate imaging stations of DeTitta

(Inokuchi, col. 17, ll. 43-50).

As per claims 12, 24, and 41, Inokuchi teaches:

wherein said at least one computer network is the Ethernet. (col. 16, l. 65).

10.   Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta

as applied to claims 13 above, and further in view of Bacus et al., (hereinafter Bacus), US

6226392 B1.

As per claim 25, DeTitta does not specifically teach color images are obtained of the

crystals. However, Bacus teaches:

wherein said images of said plurality of microscopic crystals are color images. (col. 8, ll. 56-58)

It would have been obvious to one of ordinary skill in the art to use the color filter wheel of Bacus with the imaging sensor of DeTitta to provide color images that will allow for more accurate classification of crystals when classification may be based upon the certain colors in the crystals. Furthermore, Bacus teaches that color images have been well known in inspection systems for a number of years.

As per claim 26, Bacus teaches:

A) viewing each of said plurality of microscopic crystals through a first linear polarized filter (figure 4B, elements 172 or 170) and a second colored filter (figure 4B, element 180), wherein the color of said second colored filter is altered between red, green and blue (col. 8, ll. 57-58), to obtain a first image, a second image and a third image, and

B) combining said first image, said second image and said third image to obtain said true colored images (col. 8, ll. 59-62).

11.   Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeTitta and Bacus as applied to claims 13 above, and further in view of Glazer et al (hereinafter Glazer), UK 2310925.

As per claim 27, Bacus does not specifically teach using false colors. However, Galzer teaches:

steps of viewing each of said plurality of microscopic crystals through a first linear polarized filter (figure 1, element 15) and a second linear polarized filter (figure 1, element 14) to obtain said false color images (p. 2, second paragraph).

It would have been obvious to one of ordinary skill in the art to use the false colors of

Glazer in the color crystal images of DeTitta and Bacus to measure the refractive indices of a

crystal which by using false colors allow for indications or measures across the sample for its

optical anisotropy, which provides additional data to further classify any crystal material and

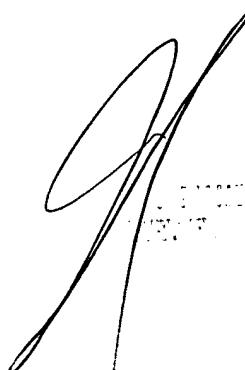take advantage of the image processing inspection system.

Conclusion

12.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. The following U.S. patent(s) refer(s) to color filtering: Bos et al., 5714970, Miller,

5689317, and Treado, 6002476.

13.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Martin Miller whose telephone number is (703) 306-9134. The

examiner can normally be reached on Monday-Friday, Maxi-flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 872-9314 for regular

communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is (703) 305-3900.

mem
August 8, 2002